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(54) GROUP III NITRIDE SEMICONDUCTOR LIGHT-EMITTING ELEMENT

(57) Abstract:

PROBLEM TO BE SOLVED: To improve luminous intensity and improve the turning blue of lumines cent color.

SOLUTION: A buffer layer 2 of AlN 500 Å is formed on a sapphire board 1, and thereon a high carrier concentration n^+ layer 3 of silicon-doped GaN about 2.0 μm in thickness and $2x10^{18}/cm^3$ in concentration of electrons, a high carrier concentration n^+ layer 4 of silicon-doped $(Al_{x2}Ga_{1-x2})_{y2}In_{1-y2}N$ about 2.0 μm in thickness and $2x10^{18}/cm^3$ in electron concentration, an n layer (luminous layer) 5 of zinc and silicon-doped $(Al_{x1}Ga_{1-x1})_{y1}In_{1-y1}N$ about 2.0 μm in thickness, a p layer 6 of magnesium-doped $(Al_{x2}Ga_{1-x2})_{y2}In_{1-y2}N$ about 1.0 μm in thickness and $2x10^{17}/cm^3$ in hole concentration are formed in the order. An electrode 7 and an electrode 8 made of nickel are formed at the p layer 6 and a high concentration n^+ layer, respectively, and they are electrically isolated form each other by trench 9. The component ratios of Al, Ga, and In in the layers 4, 5, and 6 are selected, so that the lattice constant in each layer may accord with the lattice constant of the layer 3.